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CHARLES ROBERT OSTEN SACKEN,
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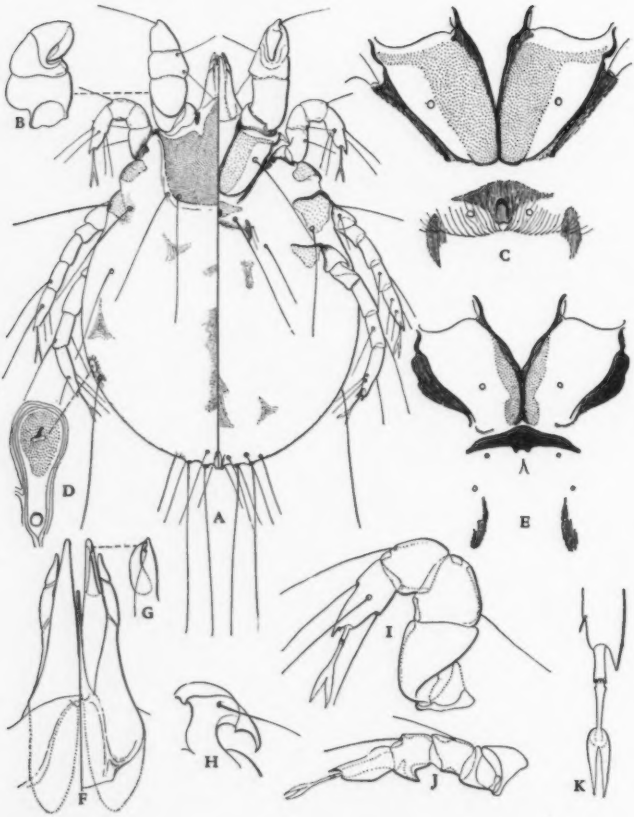

MYIALGES CAULOTOON, A-D, F, G, I, K. M. ANCHORA, E, H, J.—FERRIS.

ENTOMOLOGICAL NEWS

VOL. XXXIX MAY, 1928 No. 5

The Genus Myialges (Acarina : Sarcoptidae).

By G. F. FERRIS, Stanford University, California.

Plate III.

The members of the mite family Sarcoptidae are characteristically parasites of mammals. However, a single genus, *Myialges,* with two known species, occurs on flies of the family Hippoboscidae. The two named species were originally recorded from Africa in 1907, and as far as I have been able to determine there have been no additions to the knowledge of the genus since.

In the course of working over a rather large amount of material belonging to the Hippoboscidae, I have upon three occasions met with these mites. Two species are included in the material at hand. The existing descriptions omit reference to some structures of specific importance and it is possible that the forms at hand are new, but I am disposed to believe that this is not the case and to refer my material to these named species.

It is not possible to add anything to the knowledge of the biology of the species, but the descriptions may be considerably amplified and as the genus has not appeared in American literature I shall here review what is known of its biology.

Subfamily MYIALGESINAE Trouessart.

1907. Trouessart, Bull. Soc. Zool. France 31:128.

Type and only included genus, *Myialges* Sergent and Trouessart.

The following general notes apply to both species.

Thus far, except for the first stage of *M. anchora,* only the adult females are known. These are found attached by their beaks to the body of the fly host. In the case of the specimens which I have myself seen all but one were attached to the abdomen, this one being on the thorax. Sergent and Trouessart record them as occurring on both parts of the body. That

they are really parasitic on the flies seems certain. About the point of attachment a definite scar is formed in the derm of the host by the deposition of additional chitin, indicating that the mites have been attached for some time.

The females are accompanied by masses of minute, slightly elongate and curved eggs, each of which is attached by a slender thread to the fly or to the mother. As to just which I have been unable to decide. In some cases the abdomen of the fly may be almost concealed beneath these egg masses as several of the mites may occur on a single host individual. Trouessart and Sergent express the belief that the males may be found upon the body of the bird host of the fly.

As originally described the two species of mites occurred on different fly hosts, but in the material at hand I have taken both from the same individual. In view of this fact I have been unable to avoid a suspicion that actually the two forms have some connection with each other. Were it not that both seem to be associated with deposited eggs—although there is a possibility of error here—and that both indubitably contain eggs within their bodies it might be suspected that one is simply a developmental form of the other. Something of the sort is recorded in the case of the Analgesidae and that it is not even yet beyond possibility is indicated by the fact that in the smaller form the vulva does not appear. This is said to be the case in the Analgesids, where a preliminary "copulatory form" is found. However, there is nothing to do at present but to call them different species.

Genus **Myialges** Sergent and Trouessart

1907. Sergent and Trouessart, Compt. Rend. Soc. Biol. 62:444.

Type, *Myialges anchora* Sergent and Trouessart. One other species, *M. caulotoon* Speiser, included.

Mialges anchora Sergent and Trouessart. Figs. E, H, S.

1907. Sergent and Trouessart, Comp. Rend. Soc. Biol. 62:444; fig.

Previous record. From *Pseudolynchia* (=*Lynchia*) *maura*, a Hippoboscid fly, Algeria.

Present record. From *Ornithoica confluenta* (=*O. promiscua*) Pasadena, Calif. and Puerto Princesa, Palawan, Philippine Islands and from *O. philippinensis,* Mati, Davao, Mindanao, Philippine Islands.

Myialges caulotoon Spieser. Figs. A, B, C, D, F, G, I, K. 1907. Speiser, Rept. Mjoberg's Kilimandjaro Exped. 10:1:9.

Previous record. From *Lynchia* (=*Olfersia*) *ardeae,* British East Africa.

Present records. From *Ornithoica philippinensis,* Mati, Davao, Mindanao, Philippine Islands and *O. confluenta,* Puerto Princesa, Palawan, Philippine Islands.

NOTES ON THE SPECIES.

The two species differ notably in size, *M. caulotoon* being .5-.6 mm. in length as compared with .3-.35 mm. for *M. anchora.* The anterior legs of both are very stout but in *caulotoon* they exceed the beak, while in *anchora* they do not. There is a notable difference in the claw of the anterior legs, this in *anchora* (fig. *H*) being stalked and anchor-shaped—whence the name of the species—while in *caulotoon* it is sessile and obviously otherwise formed, although I have not been able to decipher its exact shape.

The second legs are also very different, in *anchora* (fig. *J.*) the penultimate segment being armed with a stout, recurved hook which is lacking in *caulotoon* (fig. *I*).

The character of the epimerites and of the region about the vulva is strikingly different in the two species. In *caulotoon* (fig. *C*) the epimerites are connected posteriorly while in *anchora* they are not and there is a difference in the form and extent of the chitinized areas enclosed in the epimerites. In *caulotoon* the vulva is evident, in the other I have been unable to detect it and in addition a marked difference in the shape of the accompanying chitinized areas will be noted.

Otherwise the two species are very similar and I add the following notes to the genus. The legs, except for the first pair, are destitute of claws but bear a caroncle of the form shown in fig. *K.* The beak is as shown in fig *F,* the mandibles chelate (fig. *C*). On the lateral margin of the abdomen

there appears a very small chitinous spot which encloses a minute opening (fig. *D.*) that somewhat suggests a spiracle. The abdomen, as is common to the family, is marked with fine ridges. In the figure of *M. caulotoon* (fig. *A*) I have indicated merely what a student of finger prints would call the "deltas, loops and arches" of the pattern. It is evident, however, that these are variable in their arrangement.

EXPLANATION OF PLATE III.

Myialges caulotoon Speiser. *A*, female; *B*, anterior leg; *C*, venter of cephalothorax; *D*, undetermined structure from lateral aspect of abdomen; *F*, rostrum; *G*, chela; *I*, second leg; *K*, caroncle.

Myialges anchora Sergent and Trouessart. *E*, ventral aspect of cephalothorax; *H*, claw of anterior leg. *J*, second leg.

The Economic Importance of Paratenodera sinensis (Orthop.: Mantidae).*

By WALTER R. THIEROLF, Glenside, Pennsylvania.

(Continued from page 116).

UNCONFINED AND INSECT BAITED.

Table 2.

Date	Mantids Observed	Mantids Which Ate	Insects Offered	Insects Eaten Harmful	Beneficial	Neutral
July 18	6	1	aphids (many) ants (many)	1		
Aug. 19	1	1	house flies many	6		
Oct. 8	2	2	1 owlet moth caterpillar	2		
Oct. 10	5	4	5 tent caterpillars	4		
	16	4	15 tent caterpillars	4		
	1	1	1 meas. worm	1		
Oct. 12	1	1	2 garden spiders			1
	1	1	1 garden spider			1
	1	1	1 cricket			1
Totals	34	16		18	0	3

In the observations recorded in table 2 the freedom of the subjects was normal. While the matter of accepting food was optional the selection of such food can hardly be considered natural. Of the thirty-four specimens observed sixteen con-

sumed twenty-one insects, eighteen of which were harmful and three neutral. It is natural to assume that the appetite of these free specimens was more nearly normal than in the case of the confined mantids. The periods of time involved in these feedings varied from a few minutes to several hours. On August 19th, one mantid consumed six house flies in one hour. On October 10th, twenty-two individuals required two hours to eat eight tent caterpillars and a measuring worm. In this particular instance the mantids were captured in an open field and carried to a tree on which the caterpillars were feeding. The excitement factor due to being handled must be taken into account as a possible cause affecting appetite, also possibly the presence of numbers of specimens, for at this time the mating instinct was at a high ebb and sex stimulation together with the antagonistic attitudes of the males toward one another may have had a negative influence upon feeding. It should be noted that during these observations one pair of mantids engaged in copulation and several combats ensued among the males.

The second table would undoubtedly indicate a high degree of efficiency of *Paratenodera sinensis* on the beneficial side of the balance. The same conclusion would be drawn from the first table of results. It now remains to be seen whether the same type of insect food is selected during non confinement and freedom of food selection.

UNRESTRICTED FREEDOM.

Table 3

Date	Mantids Observed	Mantids Which Ate	Insects Eaten		
			Harmful	Beneficial	Neutral
Sept. 11	20	1		2 honey bees	
		1		1 honey bee	
		1	1 butterfly	1 honey bee	
Sept. 12	20	1		2 honey bees	1 wasp
		1		1 honey bee	
		1		1 honey bee	
		1		1 honey bee	
		1		1 honey bee	
		1		1 honey bee	
Sept. 16	1	1	1 grasshopper		
Oct. 9	1	1	2 caterpillars		
Totals	42	11	4	11	1

From an economic viewpoint the results of the third series of observations as recorded in table 3, are of importance. Of the forty-two mantids enjoying absolute freedom eleven ate sixteen insects, eleven of which were beneficial, four harmful, and one neutral. In the preceding table, where a decided capacity for harmful insects was noted, no insects of a beneficial type were offered. In this series of observations, which were made in an open field overgrown with flowering golden rod, evening primrose, and other weeds, bees were decidedly predominant in number, though other insects observed within the range of the mantids were ants, aphids, mosquitoes, fireflies, caterpillars, house flies, butterflies, moths, spiders, blister beetles, lady beetles, ground beetles, grasshoppers and wasps.

There seems to have been undoubted evidence of a preference for bees as well as a striking adaptation in the selection of an environment which was particularly attractive to bees. The time factor varied, the observation of September 11th covering one hour and fifteen minutes and that of September 12th two hours and fifteen minutes.

It would be unfair to reduce such meagre results to terms of bee destructive capacity for a season, yet it may be readily seen that a few mantids in the vicinity of an apiary would wreak destructive havoc in a short time.

SUMMARY OF FEEDING OBSERVATIONS.

Table 4

Group	Number of Mantids Feeding	Insects Eaten			
		Harmful	Beneficial	Neutral	Total
Confined and artificially fed	10	24	1	2	27
Unconfined and insect baited	16	18	0	3	21
Unrestricted freedom	11	4	11	1	16
Totals	37	46	12	6	64

While there has been no definite correlation of these three types of observations which are summarized in table 4, it may be interesting to note that the thirty-seven feeding mantids ate forty-six harmful, twelve beneficial and six neutral insects during the time they were under observation. The figures in connection with the group in unrestricted freedom naturally

bear the most damaging evidence against *Paratenodera sinensis* as an economic factor.

Analysis of Alimentary Tracts.

With reference to food eaten, the preceding methods have been both qualitative and quantitative in nature. The stomach analysis method is entirely qualitative, since no effort was made to determine the number of any species of insect present.

Table 5

Number of Mantid	Food Identified
1	Lepidopter, sawfly*
2	grasshopper, honey, bee, Lepidopter
3	nothing identified
4	Lepidopter
5	grasshopper, Lepidopter, spiders*
6	nothing identified
7	honey bee, Lepidopter
8	honey bee, Lepidopter
9	honey bee, Lepidopter, spider*
10	honey bee, Lepidopter
11	honey bee, Lepidopter, wasp
12	honey bee, Lepidopter
13	grasshopper
14	honey bee, Lepidopter, wasp
15	honey bee, Lepidopter
16	honey bee, Lepidopter, wasp
17	honey bee, Lepidopter, wasp, Ichneumonoid*
18	honey bee, lady beetle, wasp
19	honey bee, wasp
20	caterpillar, honey bee
21	grasshopper, honey bee, Lepidopter, Heteropteron*
22	honey bee, Lepidopter,* sawfly*
23	caterpillar, grasshopper
24	nothing identified
25	caterpillar, grasshopper, honey bee
26	caterpillar, honey bee, hornet, Lepidoptera
27	grasshopper, honey bee
28	caterpillar
29	caterpillar, grasshopper, honey bee, Lepidopter, Ichneumonoid*
30	caterpillar
31	caterpillar, grasshopper, honey bee, Lepidopter
32	caterpillar, Lepidopter
33	caterpillar, grasshopper, honey bee, Lepidopter
34	grasshopper, spider*
35	fly, honey bee, wasp

* Identification of starred parts was accomplished through the courtesy of Dr. W. C. Henderson, Chief of the Bureau of Biological Survey, Washington, D. C., whose assistance was procured by Dr. Philip P. Calvert, of the Department of Zoology, University of Pennsylvania, under whose direction this thesis was prepared.

The results of this check-up which are listed in table 5, would seem to be the most summary evidence of feeding habits; however, they must not be considered exhaustive because of the large number of parts unidentifiable.

The alimentary tract was removed and divided into three sections, the oesophagus and gizzard, the stomach and the intestine. The contents of these sections were spread out on watch glasses and microscopically examined for such parts as mandibles, maxillae, tarsi, claws, sections of legs, antennae, stings, hairs, scales and various other bits of characteristic chitin that could be traced to their original possessors. Since very few parts were found in the oesophagus and because of the similarity of parts found in the stomach and intestine, the results tabulated are for the alimentary tract as a whole.

Expressed in summary form, of the thirty-five alimentary tracts examined twenty-three indicated bee food, twenty-one butterfly or moth as indicated by Lepidopter, ten caterpillar, one fly, two sawfly, two Ichneumonoid, one Heteropteron, eleven grasshopper, one hornet, one lady beetle, seven wasp, three spider. The first twenty-three specimens were taken from an open field on September 16th and the remaining twelve were taken from the same locality October 2nd. At the time the latter group was captured the blossom stage of golden rod and evening primrose was on the wane, and bees, wasps and butterflies were less in evidence, having been supplanted by larger numbers of caterpillars and grasshoppers. This change of food was decidedly noticeable in the alimentary tract examination.

Table 6

Number of Mantids	Insect Foods Indicated in Alimentary Tract	Percentage of Mantids Eating Indicated Food
23	honey bee	65.7
21	Lepidopter	60.0
10	caterpillar	28.5
1	fly	2.8
11	grasshopper	31.4
1	hornet	2.8
1	lady beetle	2.8
7	wasp	20.0
2	Ichneumonoid	5.7
1	Heteropteron	2.8
2	sawfly	5.7
3	spider	8.5

In table 6 are indicated the number of mantids whose alimentary tract contained the remains of insects specified, and also the percentage of mantids examined which ate that particular kind of insect.

The results of these observations show conclusively that large numbers of mantids are depredators among the bees and that they destroy beneficial Ichneumonoids. They show the mantis also to be extremely helpful to man by destroying butterflies and moths, caterpillars their direct descendants, grasshoppers and sawflies. The other types of insects eaten are representative of both beneficial and harmful sides of the economic scale. Whether they should be definitely classed as harmful or beneficial depends upon the relative numbers of each type of victim consumed and upon our evaluation of these respective victims.

As a result of a more or less quantitative observation, F. C. Hadden ('27) states that "theoretically mantids should be and probably are, more beneficial than harmful, for it is the common, harmful insects that they catch in greatest numbers." Among the insects eaten by the mantis he includes four species of Orthoptera, one species of Homoptera, three species of Lepidoptera, fifteen species of Diptera and six species of Hymenoptera, though he does not state whether these insects were fed to the mantids or whether they were taken freely in the wild.

The fact that the insect victims of mantids are so extremely varied would appear to make them worthy agents in nature's plan to retain a normal balance in insect life.

Bibliography.

Didlake, Mary. 1926. Observations on the life histories of two species of Praying Mantis. Ent. News, vol. 37.

Hadden, F. C. 1927. A list of insects eaten by the mantis Paratenodera sinensis (Sauss.). Proc. Hawaiian Ent. Soc., vol. 6.

Rau, Phil, and Rau, Nellie. 1913. The biology of Stagmomantis carolina. Trans. Acad. Sci., St. Louis, vol. 22.

Rummel, Charles. 1926. Observations of polygamous and supposedly cannibalistic insects of the order Orthoptera. Bull. Brooklyn Ent. Soc., vol. 21.

Passing the Buck in Descriptions of Insects.

By W. S. BLATCHLEY, Indianapolis, Indiana.

During the six years spent in the preparation of the manuscript of my work on the Heteroptera of Eastern North America I was obliged to borrow, or probably I should say "tried to borrow," examples of numerous species not represented in my collection in order that I might draw up from them in my own words descriptions suitable for the character of the work which I was preparing. That work, as well as my other manuals, was intended mainly for the use of tyros or beginning students, and also for busy economic entomologists who desire to find out as quickly as possible the name of some insect in hand. On a number of occasions I was asked by persons, who did not particularly care to lend me specimens, why I did not use descriptions already in print. As an example of these, and to make the purpose of this paper more clear, I will quote the following specific instance:

In 1925 there appeared in the Proceedings of the U. S. National Museum an excellent work *for specialists* entitled "Revision of American Bugs of the Reduviid Subfamily Ploiariinae," by Messrs. McAtee & Malloch. It is a difficult group, and there were a number of the species described from the eastern United States which were not in my collection. I therefore wrote to Mr. McAtee and asked for the loan of representatives of eleven of these. A few days later I had a reply from Mr. A. Wetmore, Assistant Secretary of the Museum, stating that examples of five of the species were being sent me (the others being represented in the museum by single specimens) and adding: "We are somewhat surprised to notice your request for the loan of this material, inasmuch as the Museum has recently published a paper by McAtee & Malloch treating all the Nearctic species of this subfamily. *Certain workers*[1] who use this paper find it very satisfactory and we had hoped it would be of service to all workers in the preparation of local lists and in obtaining definite characters for the identification of the various species."

[1]The Italics are mine.

I replied, stating to Mr. Wetmore the nature of the work which I was preparing and that I desired the specimens to draw up new descriptions which would show correctly and in detail both *color* and *structural* characters. I also cited him to certain features in the McAtee-Malloch paper which render it in some respects practically useless to beginners. A few of these, briefly stated, are as follows:

EMPICORIS ORTHONEURON n. sp., p. 18—"Similar to *errabundus* in color except that," etc.

EMPICORIS RETICULATIS n. sp., p. 20—"Similar to *errabundus* in color, the spots at apices of hind wings very distinct."

EMPICORIS CULICIFORMIS (DeGeer), p. 25—"In color it agrees very closely with *errabundus* but it is distinguished structurally as indicated in the key."

EMPICORIS ERRABUNDUS[2] (Say), p. 24—In neither the description nor the key is any reference made to the color of this species except that the "hind wings are spotted with black apically." In other words, the authors presuppose that every person using their paper has at hand correctly named examples of the insect they call *Empicoris errabundus* Say. If he does not have these, and not one beginning student in one hundred will have them, the descriptions of the first three species above named are entirely worthless as far as color goes. This kind of a description is what I term, to use a slang expression now very much in vogue, "passing the buck," not only from one species to another, but passing it also to the innocent student.

There are numerous other instances of the kind in the McAtee-Malloch paper, but the most flagrant examples of this "buck passing," which I happened upon during my studies of the Heteroptera, are in a paper by H. H. Knight in Bulletin Brooklyn Entomological Society, XV, 1920, pp. 49-66, entitled "New and Little Known Species of Phytocoris from the Eastern United States." A few words of explanation in regard to this:

In 1876 O. M. Reuter, a noted European Hemipterist and

[2]The *E. tuberculatus* Banks, p. 518 of the "Heteroptera of E. N. Amer."

afterward world authority on the family Miridae, described[3] from *Texas,* a species of Mirid under the name *Phytocoris eximius.* In 1909 Reuter sent to the U. S. National Museum a specimen under the name of *P. eximius* which he had compared with the type in the Stockholm Museum. In the same year he redescribed[4] *P. eximius* from specimens which Knight states "were apparently a different species, being a form with irrorate membrane." Knight, in the paper above cited, used specimens from the eastern United States which he had compared with the paratype of a Texas species in the U. S. Nat. Museum, and which he says does not agree with Reuter's second description, to draw up a two-page description of what he (Knight) calls *P. eximius,* but which he admits in the notes which follow, may not be that species. On the subsequent pages Knight describes ten new species, viz., *P. brevifurcatus, salicis, neglectus, spicatus, cortitectus, buenoi, penipectus, pectinatus, obtectus* and *conspurcatus,* beginning the description of each of them with the words "Resembles *eximius,*" or "Very similar to *eximius,*" and giving otherwise only a few characters pertaining to the color or male genitalia, in which it differs from his detailed description of his supposed *eximius.* There are no keys to separate the species and unless a student *knows* that he has at hand for comparison specimens of the supposed *eximius* described by Knight, the descriptions given are wholly worthless, except to validate the new species for Knight and other specialists who have paratypes at hand. On pages 634 and 638-640 of the "Hemiptera of Connecticut," these deficient descriptions are copied verbatim from Knight's 1920 paper, but in this work they are accompanied by a key which will help the student to pass on them. On page 639 he describes another new species, *P. husseyi.* In the description of this he gives the color of pronotum and elytra as "nearly as in *erectus,*" and when we turn to *erectus* on the next page, we find, "very similar to *husseyi* in size and coloration," thus giving the "buck" plenty of exercise.

[3]Capsinae ex America boreali in Museo Holmiensi asservatæ. Ofv. sv. Vet.-Ak. Forh. XXXII, p. 67.

[4]Bemerkungen ueber Nearctische Capsiden. Acta Soc. Sci. Fennicae, XXXVI, No. 2, p. 23.

In a number of other instances Knight has indulged in this pastime of "passing the buck" in his descriptions, notably in his treatment of the species of *Lopidea, Plagiognathus* and *Deraeocoris* in his various isolated papers on these genera, and in the treatment of these same genera in the Hemiptera of Connecticut. In my work on Heteroptera I was obliged to copy verbatim some of these deficient descriptions, as I was unable to borrow specimens, but wished to include the species in my book.

Mr. E. P. Van Duzee, in his "Monograph of the North American Species of *Orthotylus*," has also "passed the buck" in a number of his descriptions, using the older species *O. dorsalis* (Prov.), *O. flavosparus* (Sahlb.), and others, as a basis for his "Very similar to". He even goes farther, as he describes as new *Orthotylus angulatus brunneus* as a "subspecies" and then uses that form as the basis of comparison for *O. cuneatus, O. pullatus* and *O. lateralis,* three new species which he also describes and then again uses *lateralis* as a basis for two others. Probably no one on earth except Van Duzee has at hand for comparison, determined specimens of his var. *brunneus* and species *lateralis.* Of what benefit therefore are his "very similar to" descriptions of the other species?

It is not only among Hemipterists that this "buck passing" is in vogue, but among other entomologists as well. I have recently prepared an "Annotated List of the Scarabaeidae of Florida," and in its preparation ran across numerous examples. Casey, in his "Review of the American Species of Rutelinæ, Dynastinæ and Cetoninæ[5]," almost equals Knight in the festive game. A single example from his work will suffice. In the genus *Ligyrodes* the variations of the claws of the front tarsi of the males are used in classification. In his description of his new species *L. quadripennis* on p. 182, he states: "the larger claw of the male as in *relictus.*" The next species he mentions is *L. relictus* (Say), and in the description he says "the larger claw of the male as in the preceding." How much knowledge is available to the student in these two statements?

[5]Memoirs VI, 1915.

Many other instances of this "buck passing" could be cited. Perhaps all systematists, myself included, have indulged in it at times. However, its commonness and cussedness is never forcibly brought to mind until one has to use extensively and intensively the descriptions of others in which it occurs. In my later years I have come to believe, and have tried to practice the belief, that the description of every species, new or old, should "stand on its own bottom," i. e., should be complete within itself, without reference to another species, unless the other be one well known and of wide distribution as, for instance, *Passalus cornutus* Fabr. or *Papilio ajax* L. Then, in the notes following the description, the author can make his comparisons and draw his deductions *ad libitum* without fear of being accused of "passing the buck."

On the Structure, Host Habit, Affinity and Geographic Range of Beskia (Dipt. : Tachinidae).

By Charles H. T. Townsend

The sexes of *Beskia* were not certainly distinguished by Brauer & Bergenstamm when they described *B. cornuta.* Neither sex has proclinate frontoorbitals, but both have one reclinate frontoorbital. Other head characters are very similar in the two sexes, but the male has the third antennal joint much elongated and widened, produced heavily on front apical angle in form of the blade of a pruning knife. The external genitalia are usually retracted in dried specimens so that their true character is not readily evident. The female has a sharp piercer of the ordinary short type, the base of which is overlapped by an emarginate, hairy, scale-like structure that usually stands out in profile. This structure is the larvipositor guide, borne dorsally, the vagina opening between its base and the base of the piercer. It functions during larviposition to direct the ejected maggot through the puncture made by the piercer.

Nothing is so far certainly known as to the host, but in 1908 Mr. E. O. G Kelly found on wheat in Pawnee, Oklahoma, a larva or pupa from which a specimen of *Beskia aelops*

issued later. The following extracts from correspondence refer to this specimen:

"The pupa was collected on wheat and the adult reared. The supposition is that the larva was feeding upon aphids" (F. M. Webster, February 8, 1909).

Reared from a larva found "in the act of actually feeding on a grain aphid on wheat, probably *Macrosiphum granaria*" (F. M. Webster, February 13, 1909).

Mr. Kelly's notice was attracted to this larva "from the fact that it seemed quite different from syrphid larvae which are common among aphids on grains" (F. M. Webster, February 18, 1909).

Since the *Beskia* female has a sharp piercer, it is quite out of the question that the *Beskia* larva should feed externally on aphids. The indications are that the female of *Beskia* injects a living first-stage maggot within the body of syrphid larvae which feed on aphids.

On September 23, 1911, Mr. E. S. Tucker found in axils of rice leaves at Crowley, Louisiana, two puparia of *Beskia aelops*. One was empty, but the fly issued five days later from the other. In each case the puparium was pressed as deeply as possible into the axil with the anal end lowermost.

The anal stigmata of the last-stage maggot and puparium of *Beskia* are borne on a pair of stout, elongate, divergent tubercles, approximated at base and rugose on their external surfaces. The respiratory area is rather reniform and shows three more or less distinct divisions, the whole area of one tubercle bearing from twelve to twenty-eight microscopic geminate warts irregularly disposed.

Beskia evidently belongs in the family Phasiidae, subfamily Phaniinae, tribe Cylindromyiini, forming a well-marked subtribe with *Hemyda, Evibrissa, Epigrimyia* and certain other genera.

Beskia aelops ranges as far north as Virginia and *B. cornuta* as far south as Rio Grande do Sul. Both reach Mexico and *aelops* may continue farther south.

Schistocercophaga, New Genus of Locust Parasites (Larvaevoridae) (Dipt.: Tachinidae).

By CHARLES H. T. TOWNSEND

Schistocercophaga n. gen.

Differs from *Hypophorinia* as follows: Facial profile receding, bulged; facialia nearly on edge, sharp; male third antennal joint four times the second; face and front nearly equilateral; frontals stopping at base of antennae; two reclinate fronto-orbitals in male; frontalia width in middle equal to parafrontalia width at same point; parafacialia narrow; one preacrostichal and two postacrostichals; median discals on intermediate abdominal segments; discal row on anal segment.

Genotype, *Oedematocera dampfi* Aldrich, Proc. Ent. Soc. Wash., XXIX, 17, Southern Mexico and Guatemala.

Schistocercophaga dampfi is a parasite of *Schistocerca paranensis,* the migratory locust of tropical America. It evidently belongs in the tribe Phoriniini and is far removed from *Oedematocera.*

Practical Hint for Breeding Lepidoptera.

Many butterflies have the habit of emerging from their cocoons at night, so that breeders have had to sit up with their charges until all hours in order to prevent them from fluttering about their cages and damaging their delicate wings. Herr Julius Stephan, a German naturalist, avoids this nocturnal labor by artificially hastening nightfall. At two or three in the afternoon he transfers the cocoons to a dark cool place, and the insects soon begin to display their normal night-reaction. By 7 o'clock all that are due to emerge that day will have put in their appearance. Science News in *Science,* April 6, 1928.

Invitation from Prof. E. O. Essig.

Beginning May 14th and continuing until June 24, 1928, E. O. Essig will conduct a University of California course in field entomology in the Yosemite National Park, with headquarters at the new Yosemite Park Museum. From July 1st to August 1st of the same season he will be at his permanent summer camp at Echo Lake, in the High Sierras, 7,500 feet altitude, eleven miles from Lake Tahoe. Entomologists visiting California are cordially invited to call on Prof. Essig at either of the above places and he will be very glad to assist them in the various types of entomological work in those regions.

Some Chilopods and Diplopods from Missouri.

By RALPH V. CHAMBERLIN

The notes of the present paper are based upon a small collection of chilopods and diplopods transmitted to me for identification by Miss Mary J. Brown. It seems desirable to publish them both because few species of these groups have been recorded from the state and because the collection includes several previously undescribed species. All of the material was collected by Miss Brown at St. Charles during 1926 and 1927. All type specimens of the new forms are in the author's personal collection.

CHILOPODA

Cryptopidae

THEATOPS SPINICAUDUS (Wood). One specimen April 16, 1927.

OTOCRYPTOPS SEXSPINOSUS (Say). Two specimens, in 1926 and one in 1927

Linotaeniidae

LINOTAENIA BRANNERI Bollman. Two specimens, 1927.

LINOTAENIA BIDENS (Wood). One specimen, 1927.

Chilenophilidae

GNATHOMERIUM UMBRATICUM (McNeill).

Geophilidae

Geophilus missouriensis, sp. nov.

The general color of the holotype as preserved in alcohol is reddish yellow above, with legs yellow. In life the color may have been distinctly red as usual in *G. mordax*. Cephalic plate broad, the caudal margin truncate, the anterior margin obtusely angular; frontal plate set off behind by a distinct pale line. Basal plate overlapped anteriorly by cephalic plate, the exposed portion at base about four times as wide as median length, but exposed along sides of rounded corners of cephalic plate. Prehensors when closed surpassing anterior end of head, attaining distal end of first antennal joint; joints unarmed excepting for a minute denticle at base of each claw; all joints very short. Anterior ventral plates deeply depressed or pitted at middle. Spiracles all circular, very gradually decreasing in size from the first caudad. Last ventral plate very wide, sides nearly parallel, the caudal margin a little convex. Pleural pores about six along each edge of ventral plate and partly covered by the latter, the most caudal pore a little largest,

and in addition a single pore above, adjacent to tergite. Anal pores distinct. Anal legs with claws long and slender. Pairs of legs in the holotype, a female, 75. Length, 38 mm.

The *holotype,* the only specimen taken, was collected in 1926, at St. Charles, Missouri.

Lithobiidae

NADABIUS IOWENSIS (Meinert). Three specimens, 1927

DIPLOPODA

Craspedosomidae

TIGANOGONA, gen. nov.

Agreeing with *Cleidogona* in general characteristics: the body consisting of 30 segments, with carinae and setigerous tubercles obsolete; ocelli numerous and well-developed, forming a triangular patch on each side of the head; antennae long and filiform, the third joint longest, the seventh shorter than the sixth; gonopods of male consisting of two pairs of processes; first two pairs of legs in male small and slender, the next five pairs moderately crassate. Differing from *Cleidogona* in not having the ninth legs of male with basal joints enlarged and the last three reduced and hamate, all joints being of normal proportions and the first one with a process at distal end beneath. Tenth legs of male also with joints of normal proportions, the second joint with a protuberance at proximal end beneath. Eleventh and twelfth legs and their pedigerous laminae not specially modified.

Genotype *Tiganogona brownae* sp. nov.

Tiganogona brownae sp. nov.

The body in general form much as usual in *Cleidogona,* subfusiform. Brownish black above with an interrupted yellowish stripe along middle line of dorsum and one on each side of dorsum; lower part of sides and venter yellow; antennae blackish; the head between bases of antennae brown, areolate over vertex, light colored over and just above clypeal region; legs proximally yellow or whitish, the distal joints blackish. The ninth legs of male with joints of normal proportions, the process at distal end of second joint subcylindrical, of moderate length. The basal process of second joint of tenth legs of male short, nearly tuberculiform. Posterior processes of male gonopods uncate, bending forward between anterior pair, smooth. Anterior pair of processes bent caudad, the superior branch of each distally vertically laminate, bifid at end and a little bent mesad. A short cylindrical process, acutely pointed

at tip, extends ventrad just outside (laterad) of each of these processes. Length, about 12 mm.

Holotype, a male. In addition to the holotype, the *paratypes* include two females, all taken at St. Charles in 1926.

Polydesmidae

POLYDESMUS SERRATUS Say. Five specimens, mostly immature, 1927.

SCYTONOTUS GRANULATUS (Say). One specimen, 1927.

Xystodesmidae

MIMULORIA, gen. nov.

Embracing forms smaller than typical *Fontaria* as in the case of *Apheloria.* Characterized especially by the structure of the male gonopods in which the blade is not coiled as in *Apheloria,* extending cephalad, a little bent or curved toward or beyond middle of length and expanded into a small laminate plate at distal end; with a short, typically laminate spur toward base of telopodite.

Genotype *Mimuloria missouriensis,* sp. nov. *Fontaria castanea* (McNeill) of Indiana also belongs in this genus.

Mimuloria missouriensis, sp. nov.

In most specimens the general color is yellow, becoming tinged with orange cephalad, the orange color densest on anterior segments and head, the carinae usually paler than middorsal region of tergites. Only one specimen, the female allotype, appears to be in full color. In this specimen the tergites are brown with the keels yellow. Posterior angles of seventeenth, eighteenth and nineteenth tergites produced and distally rounded, those of the three preceding tergites only slightly extended, the others with caudal margins straight. Last tergite narrowly truncate at caudal end, scarcely curved ventrad. Anal valves mesally strongly margined. Anal scale triangular, the sides convex. Second joint of legs with the usual long spine at distal end, but first joint and sternum unspined. The gonopods of the male have basal spur of telopodite laminate and acutely pointed. The expanded distal plate with a thin, slender, acutely pointed process at right angles to general surface. Length, 19 mm.

The types embrace eight specimens of which one, the *holotype,* is an adult male. All were collected at St. Charles in 1926 and 1927.

Aquatic Hemiptera from New Mexico and Georgia, Including a New Species of Corixidae.

H. B. HUNGERFORD, Dept. of Entomology, University of Kansas, Lawrence, Kansas.

On two or three occasions Mr. Charles H. Martin, a former student at Kansas University, has sent us noteworthy collections obtained by him on occasional holiday trips. Since some of the records are new, and some of the species represented by very long series it seems worth while to record them—

In Torrence County, New Mexico during the summer of 1925 Mr. Martin secured the following species and specimens:

ARCTOCORIXA LAEVIGATA (Uhler). 180.
A. utahensis Hungerford. This species is described from Utah. 119.
A. TUMIDA (Uhler). A new record. 191.
A. EDULIS (Champ.). A new record. 16.
A. ALTERNATA (Say). A new record. 46.
RAMPHOCORIXA ACUMINATA (Uhler). A new record. 1
NEOCORIXA SNOWI Hungerford. 13.
NOTONECTA KIRBYI Hungerford. A beautiful series showing all color phases of this variable species. 650.
N. INDICA Linnaeus. A new record. 112.
N. UNDULATA (Say). 210.

Not long ago he sent me the following insects which represented one vacation day's trip in Baker County, Georgia (Oct. 23, 1927). In this lot we find more new records and a new species:

NOTONECTA UHLERI Kirkaldy. A new record. 2
N. IRRORATA Uhler. A new record. 1.
N. HOWARDII Bueno. A new record. 131.
ARCTOCORIXA NITIDA (Fieber). 54.
A. BRIMLEYI Kirkaldy. A new record. 1.
A. LUCIDA Abbott. new record. 9.
A. INTERRUPTA (Say). A new record. 15.
A. sp. nov. Described below. 47.
GERRIS CANALICULATUS Say. 1.
TENAGOGONUS HESIONE Kirkaldy. 16.
TREPOBATES PICTUS Uhler. 12.
MESOVELIA BISIGNATA Uhler. 9.
HYDROMETRA MARTINI Kirkaldy. 8.

Arctocorixa martini sp. n.

10 mm. in length; width of head 3.5 mm. in male, a little wider in the female.

General color effect dark. Pronotum crossed by nine or ten pale, quite obscure bands that are slightly narrower than the darker bands. Pale lineations of hemelytra, transverse, slender and wavy, those at base of clavus broader and more conspicuous than elsewhere but not as wide as the black bands. Elsewhere the pale bands are not more than half as wide as the intervening black bands. Pattern of membrane continuous with that of corium.

Middle of anterior margin of vertex as seen from above slightly produced in the middle of both sexes. Interocular space: width of eye ::10:13. Frontal depression of face of male large ovate and deeply concave, attaining the eyes laterally. Thorax rather elevated as seen in lateral view. Pronotum and hemelytra strongly rastrate, membrane shiny. Metaxyphus longer than broad. Strigil elongate of 10 rows. length: breadth ::22:8. The pala of male elongate, sides nearly parallel but slightly wider in distal third, row of pegs about 30, larger at base and smaller and more crowded at tip, the distal end of the row making a neat curve following the upper distal margin of the pala. On some males there is a curious excrescense on the distal margin of the pala, in others this is entirely lacking and in one specimen is present on the tip of one pala and absent on the other.

Described from 47 specimens taken by C. H. Martin in Baker County, Georgia, October 23, 1927. *Holotype, allotype* and *paratypes* in University of Kansas Entomological collection. Some paratypes in U. S. N. Museum.

This species is of the same size as *Arctocorixa interrupta* (Say). It can be distinguished from all other species of this series by its rough surface, deeply depressed face of the male and the shape of the male pala. The right clasper of male is stout, curiously formed and turns transversely across the genital capsule.

Dr. Felt Retires as State Entomologist.

Dr. Ephraim P. Felt, New York State Entomologist, retired on March 31 to become adviser on shade trees and forest insect problems with the Bartlett Research Laboratories at Stamford, Connecticut. *Science,* April 6, 1928.

A New Type of Moth Trap.

By W. A. HIESTAND, University of Wisconsin.

During the spring and summer of 1923 the author working in collaboration with Mr. C. H. Hicks had such unprecedented success with four moth traps of their own design that it seems quite fitting to describe the construction and use of these traps to all who have occasion to collect moths in this way. Every lepidopterist who has used moth traps is aware of the feasibility of taking moths in this way and probably also of the difficulties encountered.

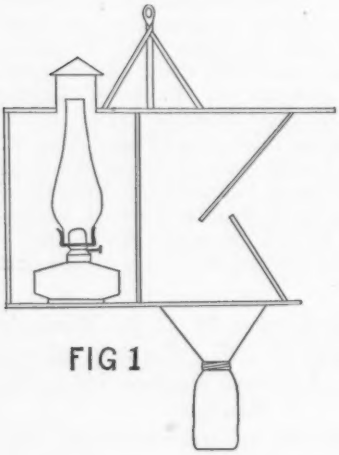

FIG 1

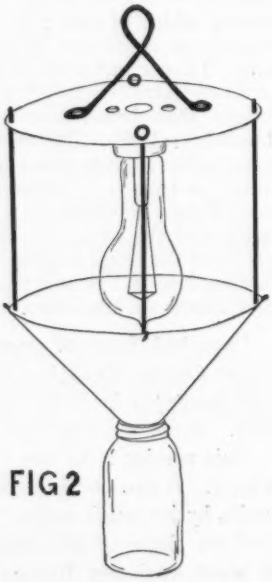

FIG 2

The conventional type of trap appears to be the age-old box trap with plates of glass placed in such positions as to keep the moths from entering the light chamber as well as to prevent their escape from the trap having once entered it. The trap of this type (fig. 1) ordinarly consists of a light chamber containing either an incandescent electric bulb or an oil lamp, the latter making it possible to hang the trap far from the source of electric current. The light chamber is separated

from the killing chamber by a plate of glass and this latter chamber confined from the outside by one or more panes of glass placed at angles to make the entrance of the moth as easy as possible and to prevent as far as possible its escape. The bottom of the killing chamber usually consists of a funnel with a screw top jar attached to it containing the killing agent, potassium cyanide. Such traps as these are offered for sale by various entomological supply houses. The chief objection to this form of trap, it was found, lay in the fact that only one side of the box was open to let the light shine out. The success of such a trap largely depends upon the location of it and the direction in which the light projects. After several trials of a wooden box trap of this type which finally resulted in the explosion of the kerosene lamp and of course burning of the trap it was decided that an improved type of trap could be constructed which gave rise to the trap described here. This trap must be used near a building or where electric current is available but it was soon found that the returns were so favorable that it was unnecessary to place the traps at any distance from the buildings, providing of course the buildings were located in regions where moths were found. Four of these traps were used outside the Biology Building of the University of Wisconsin and very good results were obtained. The best results were had when the traps were placed at the height of the third story windows. The chief advantages of this trap are its simplicity, its low cost of construction, its ease of operating and cleaning, its convenience in setting up and taking down, and most important of all its efficiency due to the great radius of light emitted.

Figure 2 illustrates the trap. It consists simply of a funnel ten inches in diameter with the spout removed and instead a screw cap of a Mason jar with a circular hole cut in it soldered to it. The funnel is hung by three or four wire rods with one end bent to form hooks so that the trap may be readily taken apart, to a circular galvanized iron disc, also ten inches in diameter. To this metal disc is bolted a porcelain socket to receive a Mazda bulb. The distance of the disc to the funnel depends upon the size of the bulb used. Best results

were obtained when the tip of the bulb projected about one and one-half inches below the top of the funnel. An eyelet or other means of support may be soldered to the top of the disc for hanging the trap. The conduits from the socket should be brought through an opening in the center of the metal disc in order not to interfere with the open sides of the trap. The cyanide used was placed in a bag of cheese cloth so that the jar could be washed out frequently. Powdered cyanide gave better results then lump cyanide. When not in use the jars can be unscrewed from the traps and regular Mason jar caps placed on them to keep the cyanide from deteriorating. Fresh dry cyanide never works as well as that which has been used a few times and has become moist so that it is advisable to place a few drops of a weak acid such as tartaric or citric acid on it for the first time it is used. Of course, cyanide may be imbedded in cotton or plaster of Paris as well as tied up in sacks but the jar may be kept clean more easily if the cyanide is not fastened to it. The above traps may be fastened to poles and placed outside of windows and so easily taken in, or suspended from limbs, etc. The collector will indeed be surprised by the effectiveness of this type of trap. In fact on warm sultry nights it was found necessary to place jars of a two quart capacity on the funnels to accommodate all of the insects caught. The manner in which the insects are caught is as follows: The brightness of the light attracts them and upon striking the bulb they drop into the jar where they are soon killed by the fumes of the cyanide. It is no exaggeration to say that as many as two hundred or more moths may be caught in a single trap on a favorable night as well as myriads of other insects such as Diptera, Coleoptera, Hymenoptera, Homoptera, Heteroptera, Trichoptera, Neuroptera, and even cockroaches.

It is the intention of the author to construct such a trap that can be used with the ordinary six volt automobile bulb to be used on camping trips in the woods. If the reader has been disillusioned with the conventional types of light traps it will be well worth his effort to try out one of this type and see how effectively it will work under favorable collecting conditions.

Entomological Literature

COMPILED, WITH THE ASSISTANCE OF "BIOLOGICAL ABSTRACTS," UNDER THE SUPERVISION OF E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The numbers **within brackets** [ ] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. The number of, or annual **volume,** and in some cases the part, heft, &c. the latter **within** ( ) follows; then the pagination follows the **colon** :

All continued papers, with few exceptions, are recorded only at their first installments.

•Papers containing new forms or names have an • preceding the author's name.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

☛*Note the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

GENERAL.—Alinder, S.—Eine coccinellidenfressende Rhynchote. [Mitt. Münchner Ent. Gesell.] 17: 75-76. **Balfour-Browne, F.**—The "Balfour-Browne" water-net. [8] 64: 58-61, ill. **Bezzi, M.**—L'attivita scientifica del Prof. Mario Bezzi. Elenco delle pubblicazioni. [Atti Soc. Ital. Sci. Nat. Mus. Civ. Milano.] 66: 287-312, port. **Blatchley, W. S.**—"Quit-claim" specialists versus the making of manuals. [19] 23: 10-18. **Bruce, E. A.**—Entomological notes of veterinary interest. [Proc. Ent. Soc. Brit. Col.] 24: 26-29. **Cockayne, E. A.**—Somatic mosaics and mutations. [21] 40: 17-21, ill. **Dennys, A. A.**—Some notes on the hibernating habits of insects in dry trees in the interior of B. C. [Proc. Ent. Soc. Brit. Col.] 24: 19-25, ill. **Fassl, A. H.**—Actividades de un naturalista en Colombia. [Bol. Soc. Colombiana de Ciencias Nat.] 17: 11-16, cont. **Franz von Tunkl, F.**—Ueber die brutpflege der insekten. [26] 7: 210-212, cont. **Heikertinger, F.**—Wie ordnet der Spezialist Gattungen und Arten nach einem natürlichen System? [79] 14: 24-42. **Leonard, M. D.**—A list of the insects of New York. [Cornell Univ. Agric. Exper. Sta.] Mem. 101: 5-1121. **McAtee, W. L.**—Subgenera often preferable to genera. [10] 30: 14-16. **Rau, P.**—The ecology of a sheltered clay bank; a study in insect sociology. [Trans. Acad. Science of St. Louis] 25: 157-

276, ill. **Robertson, C.**—Florida flowers and insects. [Trans. Acad. Sci. St. Louis.] 25: 277-324. **Thorndike, L.**—A historical sketch of the relationship between history and science. [76] 1928: 342-345. **Timm, P.**—Das Photographieren von Insekten in vergrössertem Massstabe. [2] 22: 76-82, ill. **Van Den Bergh, P. J.**—Indrukken van mijn reis naar Zuid Amerika. [58] 6: 49-59. **Weiss, H. B.**—James Petiver's gazophylacii. [6] 35: 411-414.

ANATOMY, PHYSIOLOGY, ETC.—Cockayne, E. A.—An error of metamorphosis, hysterotely, in a lepidopterous pupa, with a discussion on prothetely and hysterotely. [36] 75: 297-305, ill. **Fisher, R. A.**—On some objections to mimicry theory; statistical and genetic. [36] 75: 269-278. **Goldschmidt & Katsuki.**—Zweite Mitteilung über erblichen Gynadromorphismus bei Bombyx mori. [97] 48: 39-43. **Hersch, A. H.**—Organic correlation and its modification in the bar series of drosophila. [42] 50: 239-255. **Handlirsch, A.**—Der Bau des Insektenkörpers und seiner Anhänge. [Handbuch der Ent.] 1: 1186-1296, ill. **Hoffman, C. C:**—Nota acerca de un probable transmisor de la Trypanosomiasis humana, en el estade de Vera Cruz. [Revista Mexicana de Biologie.] 8: 12-18. **Hottes, F. C.**—Concerning the structure, function and origin of the family Aphididae. [95] 41: 71-84. **Katsuki, K.**—Weitere Versuche über erbliche Mosaikbildung und Gynandromorphismus bei Bombyx mori. [97] 48: 43-49, ill. **Page, H. E.**—The origin of instinct. [21] 40: 32. **Peters, H.**—Ueber das Gehör der Noctuiden. [14] 41: 371-372, ill. **Rostand, J.**—Survie des divers segments du corps les Insectes. [25] 1927: 311. **Soudek, S.**—The pharyngeal glands of the honeybee. [Bull. Sup. Agri. Brno.] C 10: 1-63, ill. **Steinfeld, H. M.**—Length of life of Drosophila melanogaster under aseptic conditions. [Univ. Cal. Pub. Zool.] 31: 132-178, ill. **Voinov, D.**—Le vacuome et l'appareil de golgi dans les cellules b genitales males de Notonecta glauca. [Arch. Zool. Exp. et Gen.] 67: 1-22, ill. **Whiting, P. W.**—Mosaicism and mutation in Habrobracon. [Biol. Bull. Marine Biol. Lab.] 54: 289-306, ill.

ARACHNIDA AND MYRIOPODA.—Baerg, W. J.—The life cycle and mating habits of the male Tarantula. [73] 3: 109-116. **Lundblad, O.**—Zur Systematik der Familie Hygrobatidae. [34] 75: 176-180. ***McGregor,**

E. A.—Descriptions of two new species of spinning mites. [10] 30: 11-14, ill. **Petrunkevitch, A.**—Systema Aranearum. [Trans. Conn. Acad. Arts & Sciences] 29: 7-270. **Verhoeff, K. W.**—Diplopoda. [Klassen und Ordnungen des Tier-Reichs.] 5: 801-1072, ill.

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OBITUARY.

CHARLES WALTER HOWARD, long a member of the American Association of Economic Entomologists, died at Wheaton, Illinois, on March 1st, 1928, from injuries received when he was struck by an interurban train.

Professor Howard was an entomologist of wide experience. Graduating from Cornell in 1904, he went to the Transvaal in 1905 as Assistant Entomologist and on the death of C. B. Simpson, in 1906, was appointed Entomologist. In 1908, he was made Chief of the Entomological Section of the Department of Agriculture of Moçambique, Portuguese East Africa.

Returning to this country in 1911, he became a special Assistant in the Rockefeller Institute for Medical Research, engaged in the search for insect vectors of poliomyelitis. In 1912 he was appointed to the entomological staff of the University of Minnesota, but in 1917 resigned his associate professorship to become Professor of Biology and soon Head of the Department in the Canton Christian College (Lingnan University).

In China his attention was quickly attracted to the needs of the silk industry in the Canton region and with remarkable success he began to apply the Pasteur methods to the control of the diseases which were rapidly wiping out silk growing in that section. Entering upon the work with an utter unselfishness and self-effacement, he won the confidence of the Chinese themselves and in 1923 he became Director of the Government Bureau for the Improvement of Sericulture of the Kwongtung Province, a position which he held at the time of his death.

In September, last, he returned to this country as Head of the Department of Zoology of Wheaton College, with the agreement that he was to return to Canton for the summer vacation and keep in close touch with the Bureau.

He was a fellow of the Entomological Society of London, a member of the American Association for the Advancement of Science, the Entomological Society of America, the South African Association for the Advancement of Science, the Royal Society of South Africa and other scientific societies. He was a member of the Pan-African Trypanosomiasis Commission and of the First International Congress of Entomology, held in Brussels in 1909. He was to have been chairman of the sericultural section of the Fifth Congress, meeting in August of this year in Ithaca.

To Professor Howard science offered first of all a field for service. Wherever he worked his interest in the human element was paramount. The result was that as a teacher and administrator he had the love and loyalty of his students and his associates. But, withal, he had a very genuine ability for research of a high order and in spite of his manifold duties in public service he had published numerous papers dealing with ticks, tsetse flies, mosquitoes and other blood-sucking arthropods. His studies on the chiggers of Minnesota constituted the first detailed work on these forms in this country.

He leaves a widow and four children, who are making their home at Wheaton, Illinois. For the present Mrs. Howard, whose work on the light organs of Photinus (as Anne B. Townsend) is well known to entomologists, is continuing his class work in Wheaton College. WM. A. RILEY.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

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For Exchange—South American and Celebes butterflies by 100 monthly arrivals, also South and North American pupae and cocoons. Mrs. Emma Kessler, 499 Manhattan Ave., New York.

Exchange—Northern Idaho Lepidoptera to exchange for exotics or other showy specimens. C. W. Herr, Priest River, Idaho.

Canarian Fauna—For all particulars apply to H. E. Appenhagen, Sta Cruz, Teneriffe, Apartado No. 202.

I am revising the genus *Ceuthophilus* (Orthoptera, Tettigoniidae, Rhaphidophorinae), and will be glad to have material from any part of the country for study and determination. Specimens will be promptly returned.—Theodore H. Hubbell, Museum of Zoology, University of Michigan, Ann Arbor, Michigan.

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